

Geotechnical Laboratory PO Box 4339 1570 Bear Creek Road Oak Ridge TN 37830 (865) 482-6497

### CERTIFICATE OF ANALYSIS

Stephen Trent Fluor Hanford, Inc. 825 Jadwin Avenue Richland, Washington 99352 January 6, 2005

This is the Certificate of Analysis for the following samples:

Shaw Project ID: Shaw Project Number: Client Sample Data Group: Date Received by Lab: Number of Samples: Sample Type:

Eberline - Hanford 100846.35000000 H2842 November 23, 2004 Two (2) Soil



**EDMC** 

I. <u>Introduction/Case Narrative</u>

Two soil samples were received by the Shaw Geotechnical Laboratory on November 23, 2004. The samples were submitted for determination of moisture content, bulk density, and sieve analysis. The sample numbers received were B191C2 and B191C3.

Please see Appendix A, Sample Number Cross Reference List; Appendix B, Analysis Results; and Appendix C, Chain-of-Custody/Sample Receipt Records.

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Reviewed and Approved:

Ralph Cole

Laboratory Manager, Geotechnical Services

JAN 1 2004

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January 6, 2005
Stephen Trent
Fluor Hanford, Inc.
Shaw Project Name: Eberline Hanford
Shaw Project No. 100846.35000000
SDG No. H2842

Shaw Geotechnical Laboratory Oak Ridge TN (865) 482-6497

### II. Analytical Results/Methodology

REFERENCES: United States Army Corps of Engineers (USACE), Engineer Manual 1110-2-1906, Laboratory Soils Testing, appendix II, 1970; United States Environmental Protection Agency, SW846, Test Methods for Examining Solid Waste, Physical/Chemical Methods, 3rd ed., Nov 1986 (EPA SW-846). Annual Book of ASTM Standards, Section 4, Construction, Volume 04.08, Soil and Rock (II), and Volume 04.09, Soil and Rock (II), 2004. Shaw Environmental and infrastructure, Standard Operating Procedures.

Moisture Content of Soil and Rock	ASTM D 2216
Bulk Density of Soils	EM 1110-2-1906
Particle-size Analysis of Soils	

### III. Quality Control

Quality control checks such as duplicates and spikes (QC samples), are not normally applicable to geotechnical testing. This is due largely to the inability of obtaining samples with known characteristics, the heterogenous nature of the samples, and quality control procedures built-in to the analytical method.

QC measures to ensure accuracy and precision of test results include the following:

- 100% verification of all numerical results raw data entries, transcriptions and calculations entered by lab technicians are checked, recalculated and verified. Most data calculations are performed by computer programs.
- Data validation through test reasonableness summaries of all test results for individual reports are reviewed to determine the overall reasonableness of data and to determine the presence of any data that may be considered outliers.
- Quality control procedures are built into most standardized geotechnical procedures. For example, liquid limit and plastic limit analyses call for re-analyses and specify acceptance criteria.
- Routine instrument calibration instruments, gauges and equipment used in testing are calibrated on a routine basis. All instrument calibration follows ASTM or manufacturer guidelines.
- Maintenance of all past calibration records calibration records and certification documents of all instruments, gauges and equipment are updated routinely and maintained in the Quality Control Coordinators Quality/Operations files.

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- Certified and trained personnel all technicians are certified by the National Institute for Certification of Engineering Technicians (NICET) in geotechnical soil testing, and are trained in the application of standard laboratory procedures for geotechnical analyses as well as the quality assurance measures implemented by Shaw.
- Quantitative analyses frequently used in geotechnical/physical testing programs do not use
  QC tools common to wet chemistry or radiochemistry laboratories. Measures not employed
  in the analysis of samples reported in this report include: laboratory control samples (LCS),
  blanks, matrix spikes (MS), duplicate analyses, dilutions, digestions, correction factors,
  surrogate sample analyses, detection limit determinations, control charts, and/or tentatively
  identified compounds (TICs).

### IV. Data Qualification

None.

Appendix A Sample Cross-Reference List Page 4 of 11 January 6, 2005 Stephen Trent Fluor Hanford, Inc. Shaw Project Name: Eberline Hanford Shaw Project No. 100846.35000000 SDG No. H2842

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### SAMPLE NUMBER CROSS-REFERENCE LIST

LAB SAMPLE NO.	CLIENT SAMPLE NO.	MATRIX
BC0473	B191C2	Soil
BC0474	B191C3	Soil

Appendix B Sample Test Results Page 5 of 11
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Fluor Hanford, Inc.
Shaw Project Name: Eberline Hanford

SDG No. H2842

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### **MOISTURE CONTENT**

**PROJECT NAME** 

**Eberline - Hanford** 

PROJECT NUMBER

100846.35000000

LAB SAMPLE NO.	CLIENT SAMPLE NO.	MOISTURE, % ASTM D 2216	MOISTURE,%	SOLIDS, % SW846
BC0473	B191C2	3.8	3.7	96.3
BC0474	B191C3	12.9	11.4	88.6
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ASTM D 2216 results are based on dry sample weight. SW846 results are based on wet sample weight. Solids content is determined by subtracting the SW846 moisture (%) from 100. Page 6 of 11 January 6, 2005 Stephen Trent Fluor Hanford, Inc. Shaw Project Name: Eberline Hanford Shaw Project No. 100846.35000000

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# BULK DENSITY/DRY DENSITY EM-1110-2-1906, APPENDIX II

PROJECT NAME:

PROJECT NUMBER:

**Eberline - Hanford** 

100846.35000000

	O) (F) (T	AVERAGE	AVERACE	MET	MOISTURE	bulk	DDV
LAB	CLIENT	AVERAGE	AVERAGE	WET	MOISTURE	BULK	DRY
SAMPLE	SAMPLE	LENGTH,	DIAMETER,		CONTENT,	DENSITY,	DENSITY,
NUMBER	NUMBER	inches	inches	grams	%	pcf	pcf
BC0473	B191C2	5.9945	3.8778	2097.22	3.4	112.9	109.1
BC0474	B191C3	5.9827	3.8683	2111.98	3.0	114.4	111.1
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Moisture content calculated by ASTM D 2216 based on sample dry weight.

Bulk density is the weight of wet sample divided by the volume of the wet sample (as-received).

Dry density is the weight of the dry sample solids divided by the volume of the original sample.

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Shaw Project Name: Eberline Hanford Shaw Project No. 100846.35000000

SDG No. H2842

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# PARTICLE-SIZE DISTRIBUTION ASTM D 422

Project Name Eberline Hanford

Field Sample No. B191C2

Project No.

100846.35000000

Lab Sample No.

BC0473

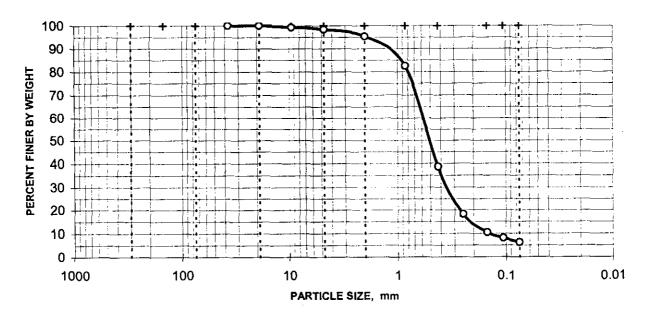
Moisture Content = 3.4% based on dry sample weight

#### SIEVE ANALYSIS

	Sieve	Diameter	Percent
С	No.	mm	Finer_
l ŏ	3"	75.000	100.0%
Ā	1.5"	37.500	100.0%
R	0.75"	19.000	100.0%
S	0.375"	9.500	99.3%
[ ]	#4	4.750	98.4%
	#10	2.000	95.4%

F	Sieve	Diameter	Percent
	No.	mm	Finer
	#20	0.850	82.5%
i	#40	0.425	38.7%
N	#60	0.250	18.2%
E	#100	0.149	10.4%
	#140	0.106	8.1%
	#200	0.075	6.2%

### **DISTRIBUTION CURVE**



1.6% Gravel

92.2% Sand

6.2% Silt/Clay

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Shaw Project Name: Eberline Hanford Shaw Project No. 100846.35000000

SDG No. H2842

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## PARTICLE-SIZE DISTRIBUTION ASTM D 422

Project Name Eberline Hanford

Field Sample No. B1

B191C3

Project No.

100846.35000000

Lab Sample No.

BC0474

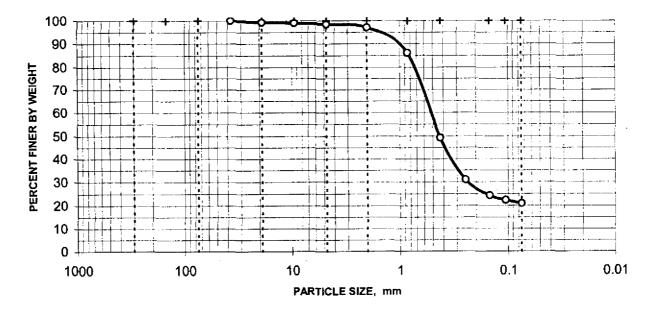
Moisture Content = 3.0% based on dry sample weight

#### SIEVE ANALYSIS

	Sieve	Diameter	Percent
	No.	mm	Finer
C	3"	75.000	100.0%
A	1.5"	37.500	100.0%
R	0.75"	19.000	99.2%
S	0.375"	9.500	99.0%
<sup> </sup>	#4	4.750	98.4%
	#10	2.000	97.1%

!	Sieve	Diameter	Percent
	No.	mm	Finer
F	#20	0.850	86.2%
	#40	0.425	49.2%
N	#60	0.250	31.0%
E	#100	0.149	24.3%
Ì	#140	0.106	22.4%
	#200	0.075	20.9%

### **DISTRIBUTION CURVE**



1.6% Gravel

77.5% Sand

20.9% Silt/Clay

Appendix C Chain-of-Custody and Request-for-Analysis Records

İ	FLUOR	t Hanford Inc.		CHAIN	OF CUSTOD	Y/SAMPLE A	NALYSIS R	EQUEST		F03-025-079	OF 1	
COLLECTOR Pope/Pfister/			COMPANY CONTACT TELEPHONE NO. PROJECT COORDINATOR TRENT, STEVE 373-5689 TRENT, S)				PRICE CODE	8N T	DATA URNAROUND			
SAMPLING 1								AIR QUALITY		45 Days /		
216-T-28; 67			1	Characterization -	Soil			F03-025		,,,,,,		45 Days
ICE CHEST	1970 ~	2 ~1/	FIELD LOGBOOK NO. COA METHOD OF SHIPMENT									
/17	KP-0:	5 016	HNF-N-356 1			119143ES10	)	Federal E	xpress			
SHIPPED TO	•		OFFSITE PROPE	KTY NO	2 ,1	1150		BILL OF L	ADING/AIR BILLY	111	160	
Shaw Group				RIVIN	- 14	YX			241	1 L 194	100	
MATRIX* A=Air DL=Drum	POSSIBLI N/A	E SAMPLE HAZARDS/ REMARKS	PRESER	VATION	None	None						
Liquids DS=Drum Solids			TYPE OF C	ONTAINER	Moisture Resistant Con	Liner	<del>  -</del>					
L=Eloraid O=Oil S=Soil	2	DG# H2842	NO. OF COM	ITAINER(S)	1	1	<del>                                     </del>			-		
SE=Sediment T=Tissue V=Vegitation W=Water			VOL	UME	200mL	1000mL						
WI=Wipe X=Other	SPECIAL	HANDLING AND/OR STORAGE	SAMPLE A	MALYSIS	Moisture Content - D2216	SEE ITEM (1) IN SPECIAL INSTRUCTIONS						
	Podica	enul Tilto: B19101						1				
SAMP	LE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME		4 9 TH 8	Service Control		· · · · · · · · · · · · · · · · · · ·			
B191C2		SOIL	11/11/04	1320	Y	X						The second of th
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CHAIN OF PO	DSSESSION	<u> </u>	SIGN/ PRINT	NAMES		!	SF	PECIAL INSTR	RUCTIONS			
RELINQUISHE		D FROM DATE/TIME	RECEIVED BYT			DATE/T	TMF					
RELINQUISHE	I NOA	44 TYRA 11-11-04 144	1	FEST!	ALL W	11/1/24/2	133	.)Particle Size	(Dry Sieve) - D42	2; Bulk Density - D2	2937;	
RILLINOUISHE		FROM DATE / TIME	RECEIVED BYT	STORED IN		DATE/T			D 34	aw Lab.		
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RELINQUISHE	D BY/REMOVE	D FROM DATE/TIME	RECEIVED BYT/	STORED IN		DATE/T	IME					
LABORATO SECTION	IKT	Exhibit	SHA	WENVING	nner	cre_	/O	TLE	<u> </u>	"	23/04 Q	1000 N
FINAL SAM	PLC	DSAL METHOD					DI	SPOSED BY			DATE/TIME	

	FLUOR Hanford Inc. CHAIN OF CUSTODY/SAMPLE ANALYSIS				NALYSIS R	SIS REQUEST F03-025-0				5-080 PAGE 1 OF 1				
COLLECTOR     COMPANY CONTACT     TELEPHONE NO.       Pope/Pfister/Wiberg/Tyra     TRENT, STEVE     373-5689									ATA AROUND					
SAMPLING L	OCATION		·	PROJECT DESIG	NATION				SAF NO.		AIR QUALITY			ays / Days
216-T-28; 90.				<u> </u>	Characterization -	Soll	r ========		F03-025				——————————————————————————————————————	
ICE CHEST N	GRP	03-0	<b>X</b> (1	FIELD LOGBOOI HNF-N-356 1	K NO.		COA 119143ES10		Federal Ex	OF SHIPMENT press				
SHIPPED TO Shaw Group				OFFSITE PROPE	اسداد ۱۸۸۸م	a 5	Re PTR	1415	BILL OF L	ADING PAIR TILL	4450			
MATRIX* A=Air DL=Drum	POSSI N/A	BLE SAMPLE	HAZARDS/ REMARKS	PRESER	NOITAV	None	None							
Liquids DS=Drum Solids				TYPE OF C	ONTAINER	Moisture Resistant Con	Liner et							
t=Liquid 0=Oil S=Soil SE=Sediment T=Tisse V=Vegitation W=Water	,	DG#	H2842	NO. OF CON		1 200mL	1 1000mL							
WI=Wipe X=Other	N/A-17	al Handlin nystical		SAMPLE A	NALYSIS	Moisture Content - D2216	SEE ITEM (1) IN SPECIAL INSTRUCTIONS							
SAMPL			MATRIX*	SAMPLE DATE	SAMPLE TIME									
B191C3		SOIL		11-15-04	0155	1	<b>K</b>							
	ВС	0474												
CHAIN OF PO	SSESSIO	N		SIGN/ PRINT	NAMES			SF	PECIAL INSTR	UCTIONS				
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LABORATOI SECTION	KT	CEIVED BY	whole		SHAW E	NUIR.	•		TLE			11/23/	04 @	000
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SDG# H2842

PAGE 1

Eberline Srvces

CHAIN OF CUSTODY ORD # R4-11-171

RCVD: 11/18/04 DUE: 01/02/05

KEEP: 01/02/06 DISP: S

WORK ID: SAF# F03-025 SDG H2842

DASH SAMPLE IDENTIFICATION	STORED	TESTS		0.472
01A-S B191C2	SHAW	DISPOS E331S E333S E335S	BC	0473
02A-S B191C3	SHAW	DISPOS E331S E333S E335S	BC	0474

11/19/04 10:22:58

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